Jurnal Agricultural Science
https://jurnal.faperta-unras.ac.id/index.php/jas
P-ISSN 2089-144X Online ISSN 3031-7398
Vol. 19 No. 2 2024

The Effect of Cow Manure Application on the Growth and Production of Cucumber Plants (*Cucumis sativus* L.)

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ABSTRACT. Cucumber (Cucumis sativus L.) is one of the vegetable plants that has many benefits, namely besides being able to be used as vegetables, fresh vegetables, salads or pickles, cucumbers are also beneficial for health because the nutritional value of cucumbers is quite good as a source of minerals and vitamins. Efforts to increase cucumber plant production can be influenced by many factors, one of which is fertilization. Fertilization is a determining factor in efforts to increase the availability of nutrients for plants, thus the expected impact of fertilization is not only to increase the yield per unit area but also to be efficient in the use of fertilizers. The method in this research is Non Factorial Randomized Group Design with four treatments and six replications, namely A0 (Control), A1 (Cow dung manure dose of 3 kg / polybag), A2 (Cow dung manure dose of 5 kg / polybag) and A3 (Cow dung manure dose of 7 kg / polybag). The results showed that the treatment of cow dung manure gave a significant effect on the parameters of plant height and fruit weight. The best treatment is found in A3, which is the application of cow dung manure at 7 kg/polybag.

Keywords : *Cucumber (Cucumis sativus L.), Cow Manure, Fertilizer, Manure*

INTRODUCTION

Efforts to increase cucumber crop production can be influenced by many factors, one of which is fertilization. Fertilization is a determining factor in efforts to increase the availability of nutrients for plants, thus the expected impact of fertilization is not only to increase the yield per unit area but also to be efficient in the use of fertilizers. Sobir and Siregar (2010), stated that the main nutrients that must be available for the growth and development of cucumber plants are nitrogen, phosphorus, and potassium nutrients, because these nutrients are generally useful to help plant growth to develop optimally, all three are primary macro nutrients because they are most needed by plants, so they are inseparable because they have different roles in helping plant growth.

Manure consists of solid waste urine. Manure derived from animals with different feed quality and livestock function has different nutrient content. Good feed quality can produce manure with high protein content with low crude fiber. In addition, manure contains calcium (Ca), magnesium (Mg), sulfur (S), manganese (Mn), zinc (Zn), or zinc, cuprum (Cu) and borium (B) (Sutanto, 2006).

The provision of nutrients can be through periodic fertilization to produce quality fruit. Based on their uses, there are two kinds of fertilizers, namely, inorganic fertilizers and organic fertilizers, both of which have their own advantages and disadvantages. Inorganic fertilizers have the advantage of being easily decomposed and can be directly absorbed by plants, so that growth becomes more fertile. However, on the other hand, inorganic fertilizers have disadvantages, namely that they are expensive, cannot solve the problem of physical and biological soil damage, and inappropriate and excessive fertilization causes environmental pollution. (Dewanto et al, 2013).

While organic fertilizers have the advantage of being able to improve the physical and chemical properties of the soil. However, in its use, organic fertilizers are required in larger quantities than inorganic fertilizers in the same area. Organic fertilizers are fertilizers composed of living matter such as weathering of plant, animal, and human remains in the form of solid and liquid, but organic animal manure fertilizers are better than other natural fertilizers and artificial fertilizers, because they are humus which contains organic compounds that are much needed by plants including macro nutrients (N, P, K, Ca, Mg and S) which are important for plant growth and development and contain many microorganisms that can destroy waste in the soil, until it turns into humus (Syarief, 2008). Based on the above problems, the authors conducted a study with the title “The Effect of Applying Cow Manure Manure on the Growth and Production of Cucumber Plants (Cucumis sativus L.)”.

MATERIALS AND METHODS

This research was carried out from August to October 2023 at Portibi Village Farmers' Field in North Padang Lawas Regency. The materials used in this study were cucumber seeds, cow dung manure, soil. The tools used are hoes, scales, sprayers, rulers or meters, label paper, stationery and

tools needed in the process of this research in the field.The research design used the Non-Factorial Randomized Group Design (RAK) method with 4 treatments and repeated 6 times. The treatments are as follows:

A0 : Control / without treatment
A1 : Cow dung manure dose of 3 kg / polybag
A2 : Cow dung manure at a dose of 5 kg / polybag
A3 : Cow dung manure at a dose of 7 kg / polybag

Research Implementation
Seed Preparation

The seeds used in this study were high-grade (certified) seeds obtained from an agricultural store. The characteristics of high-grade seeds are as follows: high growing power of more than 80%, not mixed with other varieties or it can be said that the level of purity is high, which is between 98 - 100%, has a good growing speed (vigor), shiny colored seeds, not wrinkled, pithy, and free from insect bites, not mixed with dirt, weeds or seeds of other plants.

Preparation of planting media

The planting media used is soil that has been cleaned to separate it from small rocks or gravel, this is done to avoid the growth of weeds in the planting media. After that, the soil was transferred to planting containers (polybags) according to the treatment.

Planting

Planting cucumber seeds is done directly, by punching holes in the planting medium using a tugal 2 - 4 cm deep, each planting hole is filled with seeds and covered with thin soil without compacting.

Maintenance

1. Replanting

To replace seeds that do not grow or die, replanting is carried out, replanting activities are carried out no later than 3 - 5 so that dead plants can catch up with the growth of these well-grown plants.

2. Installation of Banjaran

Cucumber is a plant that is climbing (Indeterminate), so that in its growth cucumber requires a support pole or ajir as an upright place and the formation of plant fruit is not blocked or not inhibited. With growth conditions like this, the percentage of normal fruit formation will be more than the fruits that are formed abnormally. Stake installation is carried out 1 week after planting (MST) so that the plant roots are not damaged or cut off which can cause plant stress.

3. Watering

Watering is done by using a watering can (flush tool), watering is done in the morning and evening if there is no rain.

4. Weeding

Weeding is carried out when weeds grow in the bed by pulling or using agricultural tools so that there is no competition for nutrients with the main plants which results in nutrient deficiencies that can inhibit their growth.

5. Cow Manure Application

Fertilization carried out in this study is by using cow dung manure. The application of manure was made in accordance with the treatment.

6. Pest and Disease Control

Pest and disease control is carried out when there is a pest and disease attack.

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Research Parameters

Fruit Length (cm)

Fruit length was measured at harvest, on the fruit produced by measuring from the base of the fruit to the tip of the fruit.

Number of Fruit

Performed by counting all the fruits produced when the plants were 45 HST.

Fruit Weight (g)

Observation of fruit weight per sample was done at harvest time by weighing the fruit per sample.

RESULTS AND DISCUSSION

Fruit Length (cm)

The results of variance showed that the application of cow dung manure had no significant effect on the length of cucumber fruit. The average length of cucumber plants can be seen in Table 1 below.

Table 1. Average length of cucumber fruit with cow dung manure treatment after harvesting

Treatments	Fruit Length (cm)
A0	19,45
A1	21,83
A2	21,17
A3	23,17

Based on the results of analysis of variance in Table 1 above, it is known that the provision of cow dung manure on the observation parameter of fruit length shows no significant effect on all treatments. From the average results, it can be seen that although it is not significantly different, the highest average cucumber fruit length is in the A3 treatment, which is 23, 17 cm, while the lowest average cucumber fruit length is in the A0 treatment.

From the results of the research that has been carried out, it can be concluded that the A0 treatment is not the lowest result, this is because the treatment is not given cow dung manure so that the nutrients that will be absorbed by plants are not available.

For the treatment of A1, A2 and A3, the provision of cow dung manure has not given a real effect significantly. Suwarno (2013) states that plants will thrive if the nutrients needed by plants are available in a balanced proportion, especially macro nutrients such as P and K to meet the long needs of cucumber fruit.

Number of Fruits

Observation data on the number of fruits of cucumber plants and the average number of fruits of cucumber plants can be seen in Table 2 below.

Table 2. Average number of cucumber fruits with cow dung manure treatment after harvesting

Treatments	Number of Fruits
A0	1,17
A1	1,50
A2	1,50
A3	1,67

Based on the results of variance in Table 4.4 above, it shows that treatment A0 has no significant effect on all treatments. The highest average for the number of fruits is in the A3 treatment which is 1.67 while the lowest average for the number of fruits is in the A0 treatment which is 1.17. From the results of research that has been done, the average fruit production on each stem only produces one to two cucumbers but has a very large size.

In the observation of the number of fruits, although the average results show an effect that is not real, it can be seen that the highest average is in the A3 treatment. This is because cow dung manure contains nutrients available to plants, such as N, P, K, Mg and other elements and meets the nutrients in the soil which are in the low category of 0.08% so that they can meet the nutritional adequacy of plants until their generative phase. Based on a statement from Suprihanto (2009), adding

that adequate plant nutrition plays a role in increasing the number of fruits of cucumber plants. According to the statement of Sumpeno (2001), which states that an increase in photosynthesis will produce more assimilate and plants will store it in the form of fruit.

Fruit Weight (g)

The results of variance showed that the provision of cow dung manure and NPK fertilizer had no significant effect on the fruit weight of cucumber plants. Observation data on fruit weight of cucumber plants can be seen in Table 3 below.

Table 3. Average number of cucumber fruits with cow dung manure treatment after harvesting

Treatments	Fruit weight
A0	258,64a
A1	353,23b
A2	326,89b
A3	379,63b

Based on the results of the analysis of variance in Table 4.5 above, it can be seen that the treatment of cow dung manure shows a significant effect on fruit weight parameters. From the average results of fruit weight, it can be seen that treatment A0 has a significant effect on treatment A1, A2 and A3. The highest average for fruit weight is found in A3 treatment which is 379.63 while the lowest average for fruit weight is found in A0 treatment which is 258.64.

This shows that the weight of fruit on cucumber plants is heavier with the provision of cow dung manure, because the provision of cow dung manure is the most appropriate in the need to increase fruit because it contains useful nutrients of Nitrogen, Phosphorus and Potassium needed during the production stage. This is because organic matter is the key to soil fertility and acts as a source of nutrients to stimulate flowering, fertilization and stimulate seed formation. The application of cow dung manure can increase the production of cucumber crops. This is supported by Samadi and Warsana (2018), who said that the provision of organic fertilizers in the right dose and application time will be able to increase plant growth and production optimally.

The application of cow dung manure can also increase the availability of P nutrients in the soil, the more nutrients available can increase the uptake of nutrients by cucumber plants which in turn can provide better cucumber production. This is in accordance with the statement of Sidar (2010) which states that P nutrients are needed by cucumber plants in the generative phase or in the formation of cucumber fruit.

CONCLUSION

The conclusions of the research results are: The application of cow dung manure to the production of cucumber plants showed no significant effect on the parameters of the number of fruits and fruit length while the parameters of fruit weight gave a real effect. The best treatment from the results of the research that has been carried out is in the A3 treatment (Cow dung manure 7 kg / polybag)

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